

Intraneural Ganglion in Superficial Radial Nerve Mimics de Quervain Tenosynovitis

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J Wrist Surg 2014;3:262–264.

Abstract

Background Intraneural ganglions in peripheral nerves of the upper extremity are extremely rare and poorly understood.

Case Description We report a patient with symptoms consistent with de Quervain tenosynovitis who was found to have an intraneural ganglion in the superficial radial nerve. The ganglion did not communicate with the wrist joint. We removed the intraneural ganglion, and the patient's symptoms resolved. At her 6-month postoperative follow-up, she remained asymptomatic.

Literature Review There is only one case report of intraneural ganglion in the superficial radial nerve. In that case, the patient had symptoms consistent with nerve irritation, including radiating pain and paresthesias. In contrast to that previous report, the patient in the current case had only localized pain, no paresthesias, and a physical exam consistent with de Quervain tenosynovitis.

Clinical Relevance This case demonstrates that an intraneural ganglion cyst can mimic the symptoms of de Quervain tenosynovitis without the more usual presentation of painful paresthesias.

Keywords

- tenosynovitis
- ganglion cyst

Intraneural ganglions are nonneoplastic, mucinous cysts located within the epineurium of peripheral nerves. There have been ~400 case reports of intraneural ganglia, the majority of which involve the peroneal nerve.¹ These lesions are rare in the upper extremity, and the most commonly involved nerve in the upper extremity is the ulnar nerve. These lesions are generally associated with neurologic symptoms including numbness, paresthesias, radiating pain, or motor weakness.^{1–4}

The pathogenesis of intraneural ganglions remains controversial. The predominant theory is the unifying articular (synovial) theory. The fundamental principles of this theory are that fluid dissects from a joint along an articular nerve branch and follows the path of least resistance within the nerve sheath.^{5–8} Given the high percentage of patients with associated antecedent trauma in the lower extremity, the theory concludes that an atypical joint due to trauma, degeneration, or congenital abnormality may predispose a patient to develop an intraneural ganglion. However, 40% of the

reported cases do not have this intra-articular connection.^{1,2,9}

There is currently one reported case of an intraneural ganglion cyst of the superficial radial nerve. In that case report, the patient presented with symptoms classic for intraneural ganglion, including radiating pain and paresthesias in the distribution of the superficial radial nerve.¹⁰ In contrast, we report a case of a patient who had an intraneural ganglion cyst of the superficial radial nerve and presenting symptoms that mimicked de Quervain tenosynovitis.

Case Report

A 47-year-old woman presented with 15 months of worsening right wrist pain and an associated enlarging mass. She denied any prior trauma, paresthesias, or radiating pain. On physical exam, the patient had an obvious mass overlying the first extensor compartment. The mass was longitudinally oriented and exquisitely tender to palpation. Her sensory

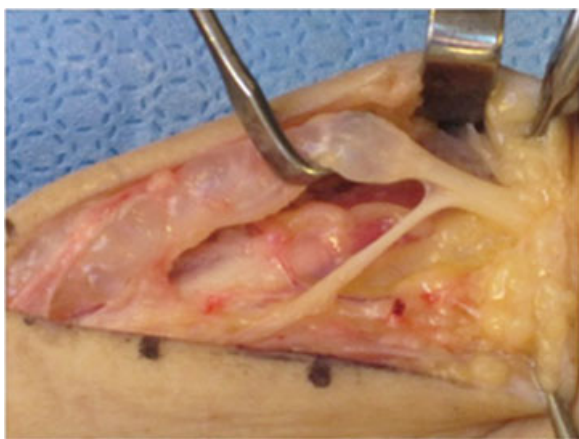


Fig. 1 Intraoperative photographs. The ganglion was confined within the epineurium of the superficial radial nerve.

and motor exams were completely normal. She had a negative Tinel sign over the mass and a positive Finkelstein test.

Given that her exam was consistent with de Quervain tenosynovitis, she was initially treated with a corticosteroid injection with 1.0 mL 1% lidocaine and 0.25 mL 40 mg/mL methylprednisolone acetate suspension into her first extensor compartment. At her 4-week follow-up, her symptoms had not improved. Radiographs of the wrist taken at that visit were unremarkable. After discussions with the patient, she chose to proceed with surgical exploration rather than undergo preoperative magnetic resonance imaging (MRI).

Under general anesthetic and tourniquet, a longitudinal incision was centered over the mass. The superficial radial nerve was identified and noted to contain an intraneural cyst (► **Fig. 1**). An epineurotomy was performed, and the cyst was separated from the nerve fascicles. The cyst remained completely intraneural and did not communicate with the wrist joint. The cyst was removed and sent to pathology. Inspection of the first extensor compartment inspection revealed no inflammatory changes, so a compartment release was deferred. Histopathology was consistent with a multicystic ganglion cyst. At her 2-week postoperative visit, the patient's pain had nearly resolved. Her symptoms had completely resolved at her 6-month follow-up, and she continued to have normal sensation.

Discussion

Intraneural ganglions are mucinous cysts located within peripheral nerves. They have been most commonly reported in the peroneal nerve and are rare in the upper extremity. These lesions are generally associated with neurologic symptoms including numbness, paresthesias, radiating pain, or motor weakness.¹⁻⁴

The pathogenesis of these lesions remains unclear. In an effort to guide treatment, there are several proposed theories for the development of intraneural ganglions. The degenerative theory is based on the premise that mucoid degeneration of the epi- or perineurium after repetitive trauma leads to

cyst formation. This theory gained some legitimacy when intra-articular connections between the cyst and nearby synovial joints were not identified intraoperatively.¹¹ A tumoral theory has also been proposed, which suggests that a nerve sheath tumor or a hematoma has the potential to transform into an intraneural cyst. Histologic analysis has never corroborated this theory.¹ Perhaps the most accepted theory is the unifying articular (synovial) theory, proposed by Spinner et al based on their experience with peroneal intraneural ganglia.⁵ The fundamental principles of this theory are that fluid dissects from a degenerative joint along an articular nerve branch and then follows the path of least resistance within the nerve sheath.^{1,5-8} However, there have been reported cases that do not have this intra-articular connection.^{2,9} In the current study, we present a further example that intraneural ganglion cysts do not always have an intra-articular connection.

Although not used in this case because of the patient's wishes, MRI remains useful in the diagnosis. MRI can help localize the presence of an intra-articular connection if one exists. The MRI can also be useful at demonstrating the relationship of the cyst to the epineurium. Intraneural ganglions are typically of intermediate signal intensity on T1 and hyperintense on T2 images.¹²

Treatment options for the management of intraneural ganglion cysts are based on ganglion pathology. Proponents of the unifying articular (synovial) theory argue that obliterating the intra-articular cyst connection and leaving the cyst cavity within the epineurium is all that is required.¹ This potentially limits the operative risk and prevents ganglion recurrence. However, in patients without an intra-articular connection, this treatment is obviously not an option. For the treatment of intraneural ganglion of a digital nerve, Han et al performed a partial resection of the cyst wall and simple drainage, and they reported no recurrence at 3 years follow-up.² Another option is resection of the involved neural segment with subsequent nerve reconstruction.⁹ Finally, as done in this case, an epineurotomy and cyst excision is a reasonable surgical option associated with low morbidity.³

To our knowledge, there is only one other case report of an intraneural ganglion cyst in the superficial radial nerve. Gillies and Burrows had a patient, similar to the patient presented in our report, who presented with painful swelling overlying the dorsoradial wrist and did not have a history of trauma. In contrast to our case, the patient in the Gillies study had numbness in the superficial radial nerve distribution, and the patient in this study had no neurologic symptoms. In both studies, the ganglion was excised while preserving the nerve fascicles, and there was no identified communication with the wrist joint.¹⁰

This case demonstrates that an intraneural ganglion cyst can mimic the symptoms of de Quervain tenosynovitis without the more usual presentation of painful paresthesias.

Conflict of Interest
None

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